WHAT IS CLAIMED IS:

1. A method for separating a mixture, the method comprising:

providing a slurry including a separation liquid and one or more particulate media materials;

performing one or more classification separations on the slurry to produce a classified media having a controlled particle size distribution of the particulate media materials;

combining the classified media with a mixture to be separated to generate a separation mixture; and

performing one or more density separations on the separation mixture.

2. The method of claim 1, further comprising:

regenerating the classified media by performing a classification separation of the media after performing at least one density separation on the separation mixture.

3. The method of claim 2, wherein:

regenerating the classified media includes removing particulate material from the classified media having a particle size smaller than a fine size particle threshold.

4. The method of claim 1, wherein performing one or more classification separations on the slurried media comprises:

separating from the slurry a coarse fraction containing coarse particles of the one or more media materials, the coarse particles having a particle size greater than a first particle size threshold; and

separating from the slurry a fine fraction from the slurry containing fine particles of the one or more media materials, the fine particles having a particle size less than a second particle size threshold.

5. The method of claim 4, further comprising:

before performing a first density separation on the separation mixture, adding a very coarse fraction of the one or more media materials to the mixture, the very coarse fraction containing media particles that substantially report to separator underflow.

6. The method of claim 4, wherein:

the first particle size threshold and the second particle threshold are determined by parameters of a separation system.

7. The method of claim 1, wherein:

performing one or more classification or density separations on the slurry or the separation mixture, respectively includes separating the slurry or the separation mixture using one or more hydrocyclone separators.

8. The method of claim 1, wherein:

performing one or more classification or density separations on the slurry media or the separation mixture, respectively, includes separating the slurry or the separation mixture using one or more cylindrical vortex separators.

9. The method of claim 1, wherein:

performing one or more classification or density separations on the slurry or the separation mixture, respectively, includes separating the slurry or the separation mixture using one or more hydrocyclone separators and one or more cylindrical vortex separators.

10. The method of claim 1, wherein:

performing one or more classification separations on the slurry includes separating the slurry using an arrangement of one or more density separators; and

performing one or more density separations on the separation mixture includes separating the separation mixture using the arrangement of one or more density separators.

11. The method of claim 1, wherein:

the one or more particulate media materials include one or more of magnetite, titanium dioxide, sand or ferrosilicate.

12. The method of claim 11, wherein:

the mixture to be separated includes one or more plastic materials.

13. The method of claim 1, wherein:

the one or more particulate media materials include magnetite and the separation media includes magnetite particles having a particle size distribution in the range from about 5 to about 30 microns.

14. The method of claim 1, wherein:

the one or more particulate media materials include magnetite and the separation media includes magnetite particles having a particle size distribution in the range from about 5 to about 25 microns.

15. The method of claim 1, wherein performing one or more classification or density separations on the slurry or the separation mixture, respectively, comprises:

separating the slurry or the separation mixture in a first density separator to generate a first fraction and a second fraction;

separating the first fraction in a second density separator to generate a third fraction;

recovering liquid from the third fraction;

combining the recovered liquid and the second fraction; and

separating the second fraction in a third density separator.

16. The method of claim 15, wherein:

separating the first fraction in a second density separator includes generating the third fraction and a fourth fraction, the third fraction including a larger amount of liquid than the fourth fraction.

17. The method of claim 15, wherein:

the first density separator is a hydrocyclone and the second and third density separators are cylindrical vortex separators.

18. The method of claim 15, wherein:

the first density separator is a cylindrical vortex separator and the second and third density separators are hydrocyclone separators.

19. A method for separating a mixture, comprising:

separating a mixture in a first density separator to generate a first fraction and a second fraction;

separating the first fraction in a second density separator to generate a third fraction;

recovering liquid from the third fraction;

combining the recovered liquid and the second fraction; and

separating the second fraction in a third density separator.

20. The method of claim 19, wherein:

separating the first fraction in a second density separator includes generating the third fraction and a fourth fraction, the third fraction including a larger amount of liquid than the fourth fraction.

21. The method of claim 19, wherein:

the first density separator is a hydrocyclone and the second and third density separators are cylindrical vortex separators.

22. The method of claim 19, wherein:

the first density separator is a cylindrical vortex separator and the second and third density separators are hydrocyclone separators.

23. A system for separating a mixture of particles, the system comprising:

a first density separator having a first exit port and a second exit port;

a second density separator fed by the first exit port of the first density separator;

a third density separator fed by the second exit port of the first density separator; and

a dewatering screener coupled to an exit port of the second density separator, the dewatering screener being configured to remove liquid from a product exiting the exit port of the second density separator, such that at least a portion of the removed liquid is fed into the third density separator.

24. The system of claim 23, wherein:

the first density separator is a hydrocyclone and the second and third density separators are cylindrical vortex separators.

25. The system of claim 23, wherein:

the first density separator is a cylindrical vortex separator and the second and third density separators are hydrocyclone separators.

26. The system of claim 23, wherein:

the separation system includes a single pump operably coupled to the first, second and third density separators.

27. A density-adjusting media for use in slurried media density separations of a mixture of materials using a density separation system, comprising:

a particulate composition of one or more materials, the particulate composition consisting of particles having a particle size distribution between a first particle size threshold and a second particle size threshold, the first and second particle size thresholds being selected based at least in part on characteristics of components of the density separation system.